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Strategic contracting increases waste prevention and materials recycling

by Paul Ligon and Tom Votta

Resource management restructures service contracts to reward resource efficiency.

Because compensation for hauling and disposal contracts currently is based on volume, collectors and landfill operators have an incentive to handle ever-increasing volumes of waste. Their customers, however, have an equal incentive to decrease waste volumes. These conflicting motivations work to impede serious progress in waste prevention, recycling and recovery.

Enter resource management — a new catch phrase in recycling. The term refers to a new concept of how to increase waste diversion through strategic contracting. At its most basic, resource management (RM) is an alternative in which the financial prize of effective source reduction and increased materials recovery is shared between waste generators and the providers of recycling and waste collection services.

But how does it work? And what are its measurable benefits?

Resource management is all about structuring contracts with service providers to incorporate recycling activities into daily operations. The trick, however, is that the contract doesn't just require recycling services, but it financially rewards increasing levels of diversion. A contractor's profitability becomes driven by waste prevention, rather than waste generation. Results to date suggest that RM contracting procedures can be used to achieve cost-effective resource efficiency in a wide range of settings.

Features of resource management

Changing the way in which service contracts are structured offers a variety of improvements over traditional hauling and disposal agreements.

Scope. Disposal contracts cover the trip from container to landfill, and most contractors are paid on a regular basis whether a container is full or near empty. RM brings the contractor's involvement upstream to address internal activities that affect waste generation and resource efficiency opportunities. This might mean working with on-site staff to optimize diversion activities, or becoming more active in public education and outreach about recycling.

Services. Traditional hauling and disposal contracts emphasize container, hauling and disposal service, in which service is defined by the number of locations and scheduled pickups. RM contracts, on the other hand, concentrate on prevention and recycling services; hauling and disposal are only the last resort for material that cannot otherwise be diverted from landfills. For waste streams of difficult-to-manage materials, RM can provide a direct incentive to research and help create new markets for materials that would otherwise end up in the landfill.

Type of relationship. The key dynamic to resource management contracting is that the customer and the contractor work together to derive profit from increased levels of diversion. The relationship is one of strategic alliance instead of individual gain.

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Incentives and compensation. RM contracts limit disposal compensation while providing opportunities for a contractor to profit from resource efficiency innovations. These incentives enhance recovery of readily recyclable materials while producing tangible prevention opportunities or market development for difficult to manage materials such as paint sludge and solvents.

Where the profits and savings come from

For many waste generators, disposal costs tend to be small compared to other business expenses. What are relatively small costs to a waste generator, however, can result in substantial increases in contract value for the service provider. For example, Metropolitan Community College, a small public institution in Omaha, Nebraska, disposes annually 1,500 tons of waste at a contractual cost of $28,000. But the institution doesn't aggressively pursue prevention or recycling, even though it would be cost-effective to do so. At MCC, disposal contract costs represent less than one-hundredth of a percent of the institution's annual expenditures of nearly $37 million. Because the institution has a high-value waste stream consisting of corrugated containers and office paper, more effective recycling alone would result in disposal savings and commodity value of nearly $10,000. If the institution were to pass these savings along to a contractor as part of a resource management agreement, it would increase the contractor's revenue by about one-third and produce a 10-fold increase in the institution's recycling rate.

With the proper RM contract incentives, recycling is not the only avenue for profit among contractors. An even greater value can be achieved through waste prevention measures. At MCC, for example, recycling a ton of office paper nets a total savings of $20 per ton. Preventing the consumption of paper (through, for instance, duplex copying) avoids purchase costs of well over $1,000 per ton. A portion of this savings potentially could be shared with the contractor.

Table 1 Contractual expenditures in 1999

Garbage and recycling collection	$7,362,005
Yard trimmings collection	$2,313,635
Recyclables processing	($300,000)
Yard trimmings composting	$401,610
Landfill	$1,919,624

Source: *Advancing RM Contracting at the Omaha Public Works Department*, Tellus Institute, 2000.

Applying the method

Omaha Public Works Department provides solid waste, recyclables and yard trimming collection, processing and disposal services to approximately 121,000 residential households in that Nebraska city. In 1999, nearly 144,000 tons of material were managed, composed of 22 percent yard-trimming compost, 14 percent recyclables and 64 percent disposal. Anecdotal evidence suggests that 50 to 60 percent of eligible city residents participate in the recycling program and that there is tremendous variation in participation across neighborhoods.

OPWD uses five separate contracts to provide residential recycling, composting and disposal services. All current contracts extend from 1996 to 2002. Annual expenditures on 1999 contracts are nearly $12 million, as shown in Table 1.

Garbage and recycling collection includes weekly curbside collection of trash and recyclables from Omaha's single-family households. Nearly 92,000 tons of trash were collected from city residents and disposed in a privately operated landfill in 1999. For recycling, the program collects newspapers, HDPE and PET plastic bottles, aluminum,

A national agenda for resource management

General Motors Corp. (Detroit) originally coined the term resource management (RM) in 1997 to reflect its position on nonproduct output, acknowledging that "there are no waste streams, only wasted resources."

To date, GM has executed RM contracts at over two-thirds of its North American facilities with significant results. Plants with RM in place for a year or more have realized a 20 percent reduction in overall waste generation in the first year (30,000 tons), a 65 percent increase in recycling (from 50,000 tons to over 82,000 tons), a 60 percent decrease in disposal and a 30 percent decrease in waste management costs.

Building on GM's success with RM, several states and the U.S. Environmental Protection Agency (Washington) are sponsoring research and demonstration projects to evaluate RM's potential in municipal, commercial and institutional settings. These projects have similar objectives: to stimulate demand for RM service by developing best practice RM contracting procedures and to develop supplier capacity to provide RM services. Ongoing projects include:

Advancing RM Contracting in Nebraska, sponsored by the Nebraska Environmental Trust (Lincoln). RM potential is being evaluated in terms of waste and cost reduction in diverse organizations throughout the state, including: ConAgra (Omaha), one of the nation's largest food processing companies; the city of Omaha; Omaha Public Power District; and Metro Community College (Omaha). RM workshops will be convened throughout the state in late March, and a final report documenting the project's findings will be available in the spring. For additional information on workshops, contact the Nebraska State Recycling Association (Omaha) at nsra@novia.net.

Executing an RM Contract for the West Des Moines School District, sponsored by the Iowa Department of Natural Resources (Des Moines). RM bid specifications, an RFP and contractual terms will be developed by this summer. The district expects to execute an RM contract by late summer.

Demonstrating the Potential for Cost-Effective Diversion through RM Contracting in Missouri, sponsored by the Missouri Department of Natural Resources (Jefferson City). Existing and potential RM contracting techniques will be demonstrated in industries and institutions in the St. Louis and Kansas City metropolitan areas. Project start-up is scheduled for later this year.

From Waste to Resource Management: Reinventing Waste Services and Contracts, sponsored by EPA's WasteWise Voluntary Partnership Program. EPA is developing an RM concept paper that will provide a foundation for research, outreach and technical assistance to more than 1,000 partners participating in its program. An initial draft of the paper will be completed soon, and several regional workshops will be convened to solicit feedback. A final report will be completed by June.

RM Supplier Forum, sponsored by Tellus Institute (Boston) with funding support from EPA. A business roundtable that includes leading national and regional recycling and waste service providers and other businesses interested in providing RM service will be convened at the Tellus Institute this spring. The forum will seek to develop supplier capacity to provide and promote RM service.

Similar local RM research and demonstration efforts are also under consideration in Florida and Massachusetts.

Table 2 Financial potential of resource management at Omaha Public Works Department

Service contracts	Fee units	Baseline: 1999 data Number of fee units	Baseline: 1999 data Hypothetical bid per unit	Baseline: 1999 data Hypothetical annual bid price	Increased recycling scenario Number of fee units	Increased recycling scenario Hypothetical annual bid price	Decreased recycling scenario Number of fee units	Decreased recycling scenario Hypothetical annual bid price
Garbage collection (1)	Households	121,006	$41	$4,913,203	121,006	$4,913,203	121,006	$4,913,203
Land disposal	Tons	92,512	$21	$1,919,624	82,512	$1,712,124	102,512	$2,127,124
Recyclables collection (2)	Households	121,006	$20	$2,448,803	121,006	$2,448,803	121,006	$2,448,803
	Tons over '99	0	$18	$0	10,000	$180,351	0	$0
	Tons under '99	0	($36)	$0	0	$0	10000	($360,702)
Recyclables processing (3)	Tons	19,582	($15)	($300,000)	29,582	($453,202)	9,582	($146,798)
Yard trimmings collection (4)	Households	121,006	$19	$2,313,635	121,006	$2,313,635	121,006	$2,313,635
Yard trimmings processing (5)	Tons	25,500	$18	$459,000	25,500	$459,000	25,500	$459,000
	> 25,500 tons	6,261	$10	$62,610	6,261	$62,610	6,261	$62,610
	Tons sold	NA	NA	($120,000)	NA	($120,000)	NA	($120,000)
Totals				$11,696,875		$11,516,524		$11,696,875

NA Not available.
Note: Bids per unit have been rounded and may not total annual bid prices.
(1) Unit cost of garbage collection is estimated at 67 percent of combined garbage and recycling contract bid price of $5.07 (in 1999 dollars) based on the relative cost of co-collection of recyclables in the same vehicle ($3.15 per house per month) versus sorted collection in separate vehicles ($4.73 per house per month) in the 1995-96 bid.
(2) Annual unit cost is the difference between 1995-96 bid price for garbage and recycling collection ($4.72 per hour) and bid assumed 1995-96 bid price for one vehicle collection ($3.15; see first note above). Values are inflated to 1999 dollars based on 1999 bid price.
(3) Assumes total recycling revenue paid to city is $300,000 annually based on 1999 payments.
(4) Annual unit cost assumes the city pays $2.39 per household per month over an eight-month period.
(5) Annual unit cost assumes city pays $18.04 per ton processed for the first 26,500 tons and $9.93 thereafter, and receives all revenues from the sales of finished compost (approximately $120,000 in 1999).
Source: *Advancing RM Contracting at the Omaha Public Works Department*, Tellus Institute, 2000.

steel and glass containers, cardboard and mixed paper. All recyclables are placed at the curb and sorted into a seven-compartment recycling vehicle by OPWD's recycling collection contractor. OPWD pays $5.07 per household per month for collection services to 121,006 households. This is by far OPWD's most expensive contract, representing about 60 percent of residential contract costs. Note that the contractor is compensated on the basis that all households receive service, although any household may choose not to use service on any given week.

Yard trimmings collection includes seasonal weekly curbside collection of yard trimmings from Omaha's single-family households (April 1 through November 30). Residents may place yard trimmings in a well-marked reusable container or a paper bag. OPWD's yard trimming collection contractor uses a compactor vehicle to transport yard trimmings to an OPWD yard trimmings composting facility. OPWD pays $2.39 per household per month for services over an eight-month period. Since yard trimmings are banned from disposal, virtually all residential yard trimmings are collected in this program, except for those composted or disposed on-site by residents.

Recyclables processing includes processing and marketing of recyclable materials collected through the garbage and recycling collection contract. OPWD pays no fee for this contract and receives 50 percent of material revenues after the first 5,000 tons. This arrangement is quite attractive because OPWD receives a significant share of the benefits of strong commodity markets without assuming any of the risks associated with volatile commodity markets.

Yard trimmings processing includes windrow composting and marketing of materials collected through the residential contract. OPWD pays $18.04 per ton processed for the first 26,500 tons and $9.93 thereafter, and receives all revenues from the sales of finished compost. A division of OPWD serves as the contractor for this based on a competitive, open market bid process.

Land disposal includes waste that is disposed at a landfill. OPWD has no contract or "minimum tonnage agreements" with the landfill and therefore pays spot market prices of $20.75 per ton disposed, including $6.25 per ton in local and state surcharges. The "no minimum" arrangement is important because it allows OPWD to realize avoided disposal savings as disposal quantities decline due to waste reduction.

Opportunities for enhancing cost-effective diversion

Because OPWD has separate collection, processing and disposal contracts, it can use savings from its disposal contract to leverage improvements in recycling collection without increasing overall contract costs (see Table 2).

The first column in Table 2 shows

OPWD's contracted services, along with "fee units" upon which contractors currently receive compensation for service. Currently, fee units for collection services are the total number of households eligible to receive service, while fee units for processing and disposal service are based on the tonnage of materials processed or disposed. In addition to the current fee units, two new performance-based fee units are added to the recyclables collection contract in Table 2: "Tons over '99" and "Tons under '99."

The performance-based fee units provide a financial incentive for collecting more recyclables, and a disincentive for collecting less. The fee unit for "Tons over '99" is $18, which simply means that for each recyclable ton over 1999 levels collected, the contractor would receive an $18 bonus. This is calculated assuming that the contractor receives one-half of city savings on avoided disposal costs and increased revenue for recyclable commodities. The fee unit for "Tons under '99" is shown as a negative $36, which means that if less than 1999 levels of recyclables are collected, the contractor pays OPWD the equivalent of $36 per ton to cover costs associated with land disposal ($20.75 per ton) and lost recyclables processing revenue (about $15 per ton).

In the "Increased recycling" scenario, the contractor collects 10,000 tons over 1999 levels. Assuming continued market strength and availability, the contractor receives a total performance bonus of $180,351 that is financed by a combination of avoided land disposal costs and increased recyclable processing revenue. The net result is a slight decline in OPWD's total contracting costs and an increase in recycling collection contractor revenues. Although an increase of 10,000 tons of 1999 levels may seem ambitious, anecdotal evidence suggests that only about one-half of the available recyclables are collected currently due to varying levels of residential participation in the recycling program. A financial incentive may cause the contractor, for example, to seek out strategies to improve participation in areas of the city with lower participation.

National potential

In 1997, approximately 100 million tons of material discarded in the U.S. were managed through contractual relationships. Experience to date suggests that up to half of these contracted discards (50 million tons) could be eliminated through resource management contracting. This would be a combined result of enhanced recovery of readily recyclable waste streams, recycled commodity market development and source reduction. Implementing resource management on this scale could lead to a national diversion rate of 51 percent, well in excess of the 35 percent goal offered by U.S. Environmental Protection Agency (Washington).

In the "Decreased recycling" scenario, the contractor collects 10,000 fewer tons than in the baseline (1999) scenario and therefore is obliged to pay OPWD liquidated damages in the amount of $360,702 to offset increased costs associated with land disposal and lost recyclables processing revenue. The net effect is no change in OPWD's total contracting cost compared to the baseline.

Pursuant with Table 2 results, OPWD could take a variety of specific actions to enhance cost-effective diversion with RM contracting:

Emphasize that maximizing cost-effective diversion is a priority in the garbage and recycling collection bid request documents. A statement should be added in the first paragraph of the collection bid contract so that contractors receive clear information on city priorities and then can respond accordingly.

Require separate bid prices for collection of garbage and recyclable materials. Although it makes sense to preserve the current single-contract arrangement, OPWD could require contractors to submit separate bid prices for garbage and recycling collection service in order to make bids as transparent as possible and to aid in the evaluation of contractor bid prices. Such an approach could be effective because OPWD already knows how much the combined services should cost based on current combined unit collection costs.

Provide a financial incentive for recyclable tonnage collected over a specified quantity. OPWD could pay the contractor a performance bonus for each recyclable ton collected without increasing the overall costs of residential solid waste management contracts. This would be accomplished by establishing a "baseline" price for current levels of recycling and paying a performance bonus for each ton of material recycled over the baseline recycling level. City savings on avoided landfill disposal fees and revenues received for recycled commodities or some combination thereof could finance the performance bonus. Alternatively, OPWD could require bidders to submit both a fixed-price bid for baseline services and a performance-based bid at or below a maximum performance bonus level established by OPWD.

Require collection contractors to achieve minimum recycling levels, or pay liquidated damages. To help ensure modest gains in recycling, minimum recycling levels could be increased over each year of the contract period. Compensation could be structured so that the contractor receives performance bonuses against a baseline as long as the minimum annual recycling level is achieved. **RR**

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